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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/270,780	03/17/99	HIYAMA	303.36384X00

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ANTONELLI TERRY STOUT AND KRAUS
SUITE 1800
1300 NORTH SEVENTEENTH STREET
ARLINGTON VA 22209

EXAMINER
Q1, Z

ART UNIT PAPER NUMBER
2871

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/270,780

Applicant(s)

HIYAMA ET AL.

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 12-15, 17-18 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 9, 11, 16 and 19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Drawings

1. Figures 32-39 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

In Figures 32-39, a label --Prior Art-- is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4, it is unclear as recite "the polarized light transmission axis is arranged approximately perpendicularly to a light control axis of the light control element". What is the light control axis of the light control element?

Claim 12, it does not indicate any specific arrangement for the reflective polarizing selective layer, the absorption type polarizing selective layer and the reflective color selective layer, and how to achieve the broaden viewing angle in the stripe direction of the reflective color selective layer.

The claimed language is unclear and indefinite and is not searchable.

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Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

5. Claims 1, 13 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by the Applicant admitted prior art.

Claims 1, 13 and 20, the Applicant admitted prior art (the "background of the invention" paragraph in the specification, especially in Figs. 32 and 35) discloses the structure of a liquid crystal display device comprising:

(concerning claim 1)

- an illumination device (51,53,54);
- a light control element (40) arranged at a projected light side of the illumination device;
- a reflective polarizer (30) arranged at an upper portion of the light control element (40),
so that the transmission axis of polarized light is adjusted so as to increase the transmission rate
of the projected light from the illumination device (51,53,54);

(concerning claims 13 and 20)

- a liquid crystal display element (20) for controlling polarization of projected light
projected from the reflective polarizer (30), so that the major axis direction of a pixel is arranged

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approximately in parallel with a direction wherein the linearly polarized light component of the projected light projected from the illumination device (51,53,54) is high;

- a screen (10AA) arranged at an upper portion of the liquid crystal display element.

Claim Rejections - 35 U.S.C. § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-3, 5-7, 10, 14, 17-18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art as applied in claim 1, 13 and 20 above in view of US 5,587,816 (Gunjima et al).

Claims 2-3, Gunjima discloses (col.5, lines 30-41) that the polarizing sheet provided on the light-incident side of the liquid crystal display element, such that the transmittance thereof is maximized with respect to the p polarized light component which is emitted from the polarized light separator.

Gunjima also discloses (col.3, lines 11-15 and col.2, lines 27-31) that the s polarized light component is reflected and is reused.

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Gunjima also indicates (col.5, lines 36-41) that an average direction of an optical axis of polarization of a light ray emitted from the flat light guide in the flat illumination device approximately agrees with the optical axis of polarization of the polarizing sheet on the light-incident side of the liquid crystal display element, i.e., the polarized light transmission axis of the reflective polarizer is approximately in parallel with a major axis direction of pixel of the liquid crystal display element (because the p polarized light is transmitted), so as to obtain a maximized transmittance.

Concerning claim 3, the optical axis of the s polarized light component is perpendicular to the optical axis of the p polarized light component, and the minor axis direction of the pixel also is perpendicular to the major axis direction of the pixel, so that is such composed polarizer having the directivity of the light in a minor axis direction of the pixel.

Applicant admitted prior art also discloses (page 5, lines 5-6) that the viewing angle is widened by the screen (10AA), so that is such composed screen broaden the projected light in the minor direction of the pixel.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange such polarizer as claimed in claims 2-3 for achieving maximized transmittance and reusing the light.

Claim 5, Applicant admitted prior art discloses (page 4, lines 23-25 and Fig.32) that a screen (10AA) has transparent portions in the shape of quadrangular pyramid at the displaying plane side and black absorbing bodies covering the intervals therebetween, i.e., a screen

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composed to absorb external light (because the black absorbing bodies) and to transmit projected light from the illumination device (because the transparent portions).

Claims 6 and 14, Applicant admitted prior art discloses (page 6, lines 10-20 and Fig.35) that in the light control element (40), generally, PET (polyethylene terephthalate) film having a birefringence material is used. So that the PET film is a birefringent medium, and that is arranged between the illumination device (51,53,54) and the light control element (40).

Claims 7, 18 and 22, Applicant admitted prior art discloses (page 4, lines 18-22) that the liquid crystal layer (13) is interposed between two transparent substrates (11A, 11B) and two polarizers are arranged on either side thereof.

Gunjima discloses (col.17, lines 36-67 and Fig.1) that a liquid crystal display element using a pair of absorbing type organic polarizing plates (9 and 10), so as to increase the contrast ratio.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a pair of absorption type polarizers as claimed in claims 7,18 and 22 for increasing the contrast ratio.

Claims 10 and 17, normally, the reflective color selective layer corresponding to the pixel of the liquid crystal element as shown in the Applicant admitted prior art Fig. 37 to display the color image.

6. Claims 8, 15 and 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art as applied to claims 1,13 and 20 above, and further in view of US

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6,147,725 (Yunki et al) .

Claims 8, 15 and 21, Yunki discloses (col.2, lines 19-54 and Fig.13) that a illumination device comprises:

- a flat shaped waveguide (light guide 206);
- a light source (lamp 201) arranged adjacently to the waveguide (206);
- a reflector (reflecting sheet 207) with a plurality of sawtoothed diffused reflection parts (208a-208d), i.e., the reflector composed of numerous protruded planes, each of which have slightly declined planes, at a rear plane of the waveguide (206), and also at the rear plane of the illumination device as claimed in claim 21;
- the projected light from the light source (201) is propagated in the waveguide (206) and projected from the light projecting plane of the waveguide (206);

Although Yunki does not expressly disclose the declined plane of the reflector are manufactured to be mirrors, but using mirror plane for reflecting light was common and known in the art.

Yunki also indicate (col.2, lines 50-54) that this reflection light is repeatedly carried out in the light guide plate (206), whereby the amount of light passing the polarizing separating film (205) is increased, thereby decreasing loss of the lamp light.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange such illumination device as claimed in claims 8, 15 and 21 for increasing the amount of light passing the polarizer and decreasing the light leakage.

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Allowable Subject Matter

7. Claims 9, 11, 16 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record neither teaches nor discloses a liquid crystal display device comprises various elements as claimed, more specifically, as the following:

the light control element is any of a isotropic medium and a uniaxial birefringent medium [claims 9 and 16];

an angle range θ_1 wherein the brightness becomes $\frac{1}{2}$ of the peak from the illumination device satisfies: $\theta_1 \leq \sin^{-1}(n \sin(\tan^{-1}(2d/t)))$ wherein t is thickness of substrate, n is refractive index of substrate, d is length of minor side of pixel of the liquid crystal display element [claims 11 and 19].


The closest references Applicant admitted prior art and the US 5,587,816(Gunjima et al) disclose that a LCD device using illumination device and polarized light separating sheet between a light guide and the display in which reusing the light to increase the brightness, but it does not show the light control element is isotropic medium or uniaxial birefringent medium and the specific relation of the angle range with the substrate thickness and the length of the minor side of the pixel.

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Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
September 26, 2001


William L. Sikes
Supervisory Patent Examiner
Technology Center 2800